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The Effectiveness of a Multidisciplinary Group Rehabilitation Program on the Psychosocial Functioning of Elderly People Who Are Visually Impaired

Manna A. Alma, Johan W. Groothoff, Bart J. M. Melis-Dankers, Theo P. B. M. Suurmeijer, and Sijrike F. van der Mei

Structured abstract: *Introduction:* The pilot study reported here determined the effectiveness of a multidisciplinary group rehabilitation program, Visually Impaired Elderly Persons Participating (VIPP), on psychosocial functioning. *Methods:* The single-group pretest–posttest pilot study included 29 persons with visual impairments (aged 55 and older) who were referred to a low-vision rehabilitation center. The VIPP intervention (20 weekly meetings) consisted of four components (practical training; education, social interaction, counseling, and training in problem-solving skills; individual and group goal setting; and a home-based exercise program). Psychosocial adaptation to vision loss, helplessness, self-efficacy, mental health, and fear of falling were used as indicators of psychosocial functioning and were assessed at the baseline, halfway, immediately after completion of the intervention, and at the six-month follow-up. *Results:* Directly after the intervention, the participants' adaptation to vision loss ($ES = 0.57$), self-efficacy ($ES = 0.50$), and mental health ($ES = 0.39$) improved compared to the baseline. Moreover, helplessness and a generic and vision-specific fear of falling decreased ($ES = 0.26$, $ES = 0.20$, and $ES = 0.24$, respectively). The six-month follow-up measure indicated improved adaptation to vision loss ($ES = 0.54$), a lesser feeling of helplessness ($ES = 0.53$), better mental health ($ES = 0.22$), and a lesser vision-specific fear of falling ($ES = 0.27$). In contrast, a decrease in self-efficacy ($ES = 0.14$) and an increase in the generic fear of falling ($ES = 0.18$) were found. *Discussion:* The tentative conclusion of this small-scale pilot study is that the VIPP program benefits psychosocial functioning in both the short and long term. *Implications for practitioners:* The study showed that low-vision rehabilitation centers could implement multidisciplinary group rehabilitation programs, such as VIPP, to improve the psychosocial functioning of elderly people who are visually impaired.

A decline in visual function is a common problem among the elderly population. Along with the general consequences of aging, elderly persons who are visually impaired experience restrictions in daily life because of vision loss that may lead to dependence (Alma et al., 2011a; Crews & Campbell, 2001; West et al., 2002). The impact of vision loss is profound, evidenced by deleterious effects on emotional adaptation (Horowitz, 2004; Wahl, Schilling, Oswald, & Heyl, 1999), an elevated risk for depression (Burmedi, Becker, Heyl, Wahl, & Himmelsbach, 2002; Casten, Rovner, & Tasman, 2004), a high level of emotional distress (Williams, Brody, Thomas, Kaplan, & Brown, 1998), reduced mental health (Lee, Cunningham, Nakazono, & Hays, 2009), and a decline in life satisfaction (Heyl & Wahl, 2001; Wahl et al., 1999), and general well-being (Burmedi et al., 2002). Furthermore, social functioning may be impaired, which may lead to social isolation and loneliness (Alma et al., 2011b). Therefore, the psychosocial needs of those who are visually impaired should not be neglected and should be part of

their rehabilitation (Agency for Healthcare Research and Quality, 2002).

In the Netherlands, the majority of low-vision rehabilitation services are provided on an individualized basis. Group-based programs, however, offer the opportunity for social interaction and allow the participants to share a range of experiences and coping strategies for both functional and emotional issues (Rees, Saw, Lamoureux, & Keeffe, 2007). Contact with peers is highly valued by persons who are visually impaired (Rees et al., 2007) and allows for social support, which seems to be an effective buffer against the negative effects of vision loss (Burmedi et al., 2002).

Therefore, we developed a multidisciplinary group rehabilitation program, Visually Impaired Elderly Persons Participating (VIPP), according to the principles of intervention mapping (Bartholomew, Parcel, & Kok, 1998). For this purpose, we reviewed the literature; performed focus group interviews with elderly persons with visual impairments; organized a meeting with rehabilitation health professionals, researchers, and elderly persons with visual impairments; and examined the determinants of participation (Alma, Van der Mei, Groothoff, & Suurmeijer, 2012). The results guided the development and design of the VIPP program.

The program aims to promote adaptation to vision loss and to improve psychosocial functioning. It consists of 20 structured weekly group sessions (duration 2 hours) and a booster session at 12 weeks. There are four components: (1) training of practical skills; (2) education, social interaction, counseling, and training in problem-solving skills; (3) individual and group goal setting; and (4) a home-based

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exercise program. The structured sessions start with 60 minutes of practical training by two occupational therapists. After a 15-minute break, a social worker continues with a 45-minute education and counseling session. In addition, an exercise coach introduces simple physical exercises and a graded walking program and delivers telephone counseling throughout the program according to the principles of motivational interviewing (Miller & Rollnick, 2002). The perceived progress, benefits, and difficulties of physical activity are discussed. Sessions are conducted in small groups that contain sufficient participants to enable social interaction, but have a maximum of nine participants to ensure safety within the practical training component. The program's supervisors were trained before the start of the intervention. Detailed information and the program manual (in Dutch) can be obtained from the first author. The pilot study was a preliminary investigation of the impact of VIPP on psychosocial functioning, that is, adaptation to vision loss, helplessness, self-efficacy, mental health, and fear of falling.

Methods

PARTICIPANTS

The participants originated in a previous cross-sectional study (Alma et al., 2011a) that included persons with visual impairments who were aged 55 years and older, able to speak Dutch, able to understand instructions concerning response sets, and referred to a low-vision rehabilitation center according to the Dutch guidelines (De Boer, Langelaan, Jansonius, & Van Rens, 2005). The cross-sectional study included elderly persons who were visu-

ally impaired who were referred to Royal Dutch Visio (region North Netherlands) in the year preceding the data collection. Of these new elderly clients, an age-stratified sample of 350 persons was drawn ($n = 264$ met the inclusion criteria; $n = 173$ participated). The participants of the cross-sectional study were eligible for the pilot intervention study ($n = 134$) if they were able to walk (with or without a walking aid) and if they had a total score of 7 and below on outdoor participation, measured as going out to recreational, cultural, and public places—response category: 0 (never) to 5 (once a week or more), total score range: 0–15.

In November 2008, of the 134 elderly persons with visual impairments who received information about the VIPP program by mail, 43 (32%) were interested and received further detailed information by telephone. Of the 43, 29 (22%) persons gave informed consent. A nonresponse analysis showed no significant differences between those who participated in the study and those who declined ($n = 87$) with respect to age, gender, partner status, binocular visual acuity, and preintervention levels of participation ($p = .05$).

Twenty-six persons completed the entire intervention program. Three persons (10%) decided to withdraw after the first session (mean age: 71.3 years, 33% female, mean visual acuity: 0.47 logMAR). Because of the small number, we did not test for differences between those who completed the study and those who withdrew. Table 1 presents the descriptive characteristics at the baseline of the participants who completed the VIPP program.

Table 1
Descriptive characteristics of the study population at baseline ($n = 26$).

Characteristic	Value: n (%) ^a
Age, years	
Mean \pm SD	73.2 \pm 8.0
Range	57–88
Gender, female	18 (69)
Partner status, partner	12 (46)
Educational level ^b	
(Pre)primary	5 (19)
Lower secondary	13 (50)
Upper secondary	6 (23)
Tertiary	2 (8)
Self-perceived vision (VFQ-25 ^c)	
Fair	6 (23)
Poor	11 (42)
Very poor	6 (23)
Completely blind	3 (12)
Binocular visual acuity (VODS)	
Median	0.20
Mean \pm SD (logMAR ^d)	0.88 \pm 0.73
Duration of visual impairment, years	
Median	8.5
Range	3–59
Primary cause of visual impairment	
Age-related maculopathy	14 (54)
Vascular disorders ^e	2 (8)
Optic nerve disorders	1 (4)
Congenital and hereditary disorders ^f	1 (4)
Trauma	1 (4)
Cause unknown	3 (12)
Combination of causes	4 (15)
Co-morbidity	
0	4 (15)
1	14 (54)
≥ 2	8 (31)
Type of co-morbid conditions	
Diabetes mellitus	6 (23)
Osteoarthritis	7 (27)
Diseases of the respiratory system	2 (8)
Other chronic conditions ^g	17 (65)

^a Percentages are based on totals for each category, and may not total 100 because of rounding.

^b International Standard Classification of Education (ISCED) (United Nations Educational, Scientific and Cultural Organization, 2006).

^c VFQ-25, Visual Functioning Questionnaire (Mangione et al., 2001), general vision subscale: "At the present time, would you say your eyesight using both eyes (with glasses or contact lenses) is excellent, good, fair, poor, very poor or are you completely blind?"

^d LogMAR value: $-\log$ visual acuity.

^e Diabetic retinopathy, for example.

^f Retinitis pigmentosa, for example.

^g Diseases of the circulatory system, rheumatoid arthritis, diseases of the vestibular system, neurological disorders.

DESIGN

The pilot study had a single group pretest–posttest design. Data were collected in face-to-face interviews by experienced interviewers at the baseline (pretest, T0–January 2009), after 12 weeks (halfway through the intervention, T1–April 2009), immediately after the completion of the intervention (a short-term posttest, T2–June 2009), and 6 months after the intervention (long-term follow-up, T3–December 2009). The study followed the tenets of the Declaration of Helsinki and was reviewed by the Medical Ethics Committee of the University Medical Center Groningen.

MEASURES

To assess psychosocial adaptation to vision loss, we used the Dutch version of the Adaptation to Age-Related Vision Loss Scale (N-AVL-12) (Horowitz, Reinhardt, & Raykov, 2007), which was specifically developed for older adults who face late-life vision loss. The Likert-type scale ranged from 0 (strongly agree) to 3 (strongly disagree). The total scale scores ranged from 0 to 36, with higher scores indicating better adaptation (Cronbach's alpha: 0.70–0.80).

Helplessness refers to an attributional style explaining negative events and their consequences as uncontrollable, unpredictable, and unchangeable, and was assessed with the 6-item subscale of the Illness Cognition Questionnaire (ICQ) (Evers et al., 2001). The Likert-type scale ranged from 1 (not at all) to 4 (completely). The scale scores ranged from 6 to 24, with higher scores indicating more helplessness (Cronbach's alpha: 0.72–0.85).

Self-efficacy, assessed with the 5-item subscale of the Self-Management Ability

Scale-30 (SMAS-30; version 1, 2004) (Schuermans et al., 2005), refers to the ability to gain and maintain a belief in one's personal competence (Steverink, Lindenberg, & Slaets, 2005). The Likert-type scale ranged from 1 (never) to 6 (very often). The scale scores ranged from 5 to 30, with higher scores indicating more self-efficacy (Cronbach's alpha: 0.61–0.80).

Mental health was assessed with the 5-item emotional well-being subscale of the RAND-36 (Hays, Sherbourne, & Mazel, 1993). This subscale assesses feelings of depression and nervousness on a 6-point Likert-type scale from 1 (all the time) to 6 (none of the time). Raw scale scores were transformed to a 0–100 scale, with a higher score indicating better mental health (Cronbach's alpha: 0.69–0.82).

Two aspects of the fear of falling were measured: generic and vision specific. A generic fear of falling assesses the level of fear when performing easy and difficult physical and social activities. It was measured with the 16-item Falls Efficacy Scale (FES) (Yardley et al., 2005) on a 4-point scale, from 1 = not at all concerned to 4 = very concerned, with a scale score ranging from 16 to 64, with higher scores indicating a greater fear of falling (Cronbach's alpha: 0.87–0.93). A vision-specific fear of falling assesses the level of fear when using public transportation, crossing the street, walking up and down steps, walking in an area with many obstacles, walking in heavy traffic, and walking in a noisy area. These items were based on a study by Marquant (2005) and measured similar to the method in the FES. The total scale score for the vision-specific fear of falling ranged from 6 to 24, with higher scores indicating a greater

vision-specific fear of falling (Cronbach's alpha: 0.85–0.92).

Statistical analysis

Analyses were performed using the statistical software package SPSS version 16.0. A nonresponse analysis was performed with the students' *t*-tests and chi-square tests. Missing values were imputed according to the questionnaire manuals or with the average score of the completed items in the scale, provided that at least 50% of the items were completed.

The effect of the VIPP program on psychosocial outcome measures was tested with one-way repeated-measures analyses of variance (ANOVAs) and contrast tests (contrast repeated and contrast simple—reference first). The level of statistical significance was set at .05.

In addition to statistical testing, effect sizes are reported, which is particularly recommended in the case of small sample sizes (Kazis, Anderson, & Meenan, 1989). The eta squared, a measure of the effect size for use in ANOVAs, expresses the proportion of variance explained by the intervention. An eta squared of 0.01 equals 1% of the explained variance and constitutes a small effect; 6%, a medium effect; and 14%, a large effect (Cohen, 1988). For the contrast tests, the effect size (*r*) was calculated by the square root of the *F*-statistic fraction of the contrast test divided by the sum of this *F*-statistic and the degrees of freedom of the residuals (Field, 2009). An effect size (*r*) of 0.10 constitutes a small effect; 0.30, a medium effect; and 0.50, a large effect (Cohen, 1988).

Results

Of the study group, six participants (23%) attended all 20 sessions of the VIPP

Table 2

Mean scores on the psychosocial outcome measures at pretest (T0), halfway through the intervention (T1), short-term posttest (T2) and long-term follow-up (T3).

Outcome measure	T0 mean (SD)	T1 mean (SD)	T2 mean (SD)	T3 mean (SD)
Adaptation to vision loss (N-AVL-12)	21.4 (6.4)	24.3 (5.7)	25.1 (5.2)	23.9 (5.8)
Helplessness (ICQ)	15.2 (4.8)	14.1 (4.8)	14.2 (3.9)	13.1 (4.4)
Self-efficacy (SMAS-30)	20.3 (2.8)	21.2 (2.9)	21.9 (2.7)	19.9 (3.2)
Mental health (RAND-36)	68.2 (16.9)	70.2 (17.7)	75.7 (16.0)	72.5 (18.9)
Fear of falling				
Generic (FES)	26.8 (8.1)	26.5 (9.1)	25.8 (7.7)	28.2 (9.7)
Vision-specific	13.6 (5.0)	11.9 (4.8)	12.7 (4.8)	12.5 (5.3)

Note: Higher scores indicate better adaptation, more helplessness, more self-efficacy, better mental health, and more fear of falling.

program, three participants (12%) missed one session, four participants (15%) missed two sessions, five participants (19%) missed three sessions, four participants (15%) missed four sessions, and four participants (15%) missed five or more sessions. The exercise coach completed 12 telephone conversations as planned with half of the participants (mean duration: 14 minutes, *SD* 4.7, range 3–46). Forty-six percent missed only one conversation, and one participant missed two conversations. The reasons for missing a session or a telephone conversation were illness, holidays, interference with other appointments, or the inability to be reached by telephone.

Table 2 presents the mean scale scores of the psychosocial outcome measures at T0, T1, T2, and T3. To facilitate a comparison between the five outcome measures and to visualize the changes throughout the intervention (see Figure 1), we standardized the raw scale scores by transforming them to a 0 to 100 scale and reversed the direction of the association for helplessness and fear of falling, so that higher scores represent better psychosocial functioning for all outcome measures.

The one-way repeated measures ANOVA (see Table 3) showed statistical

significant differences for three of the five outcome measures. Large intervention effects were found for adaptation to vision loss ($\eta^2 = 0.24$, $p < .001$) and self-efficacy ($\eta^2 = 0.16$, $p = .004$) and a medium effect for helplessness ($\eta^2 = 0.10$, $p = .046$). There were medium effects for mental health ($\eta^2 = 0.07$, $p = .15$), a generic fear of falling ($\eta^2 = 0.06$, $p = .22$), and a vision-specific fear of falling ($\eta^2 = 0.07$, $p = .13$), although not statistically significant.

The level of adaptation to vision loss increased during the first part of the intervention [T0–T1: $ES(r) = 0.62$] and further increased during the second part (T1–T2: $r = 0.19$). After the completion of the intervention, the level of adaptation decreased (T2–T3: $r = 0.27$). A comparison between the baseline and long-term follow-up indicated an overall improvement in adaptation to vision loss (T0–T3: $r = 0.54$).

The results regarding helplessness showed a decrease during the first part of the intervention ($r = 0.25$). There was a further decrease after the completion of the intervention ($r = 0.33$) that resulted in a decrease in helplessness at the long-term

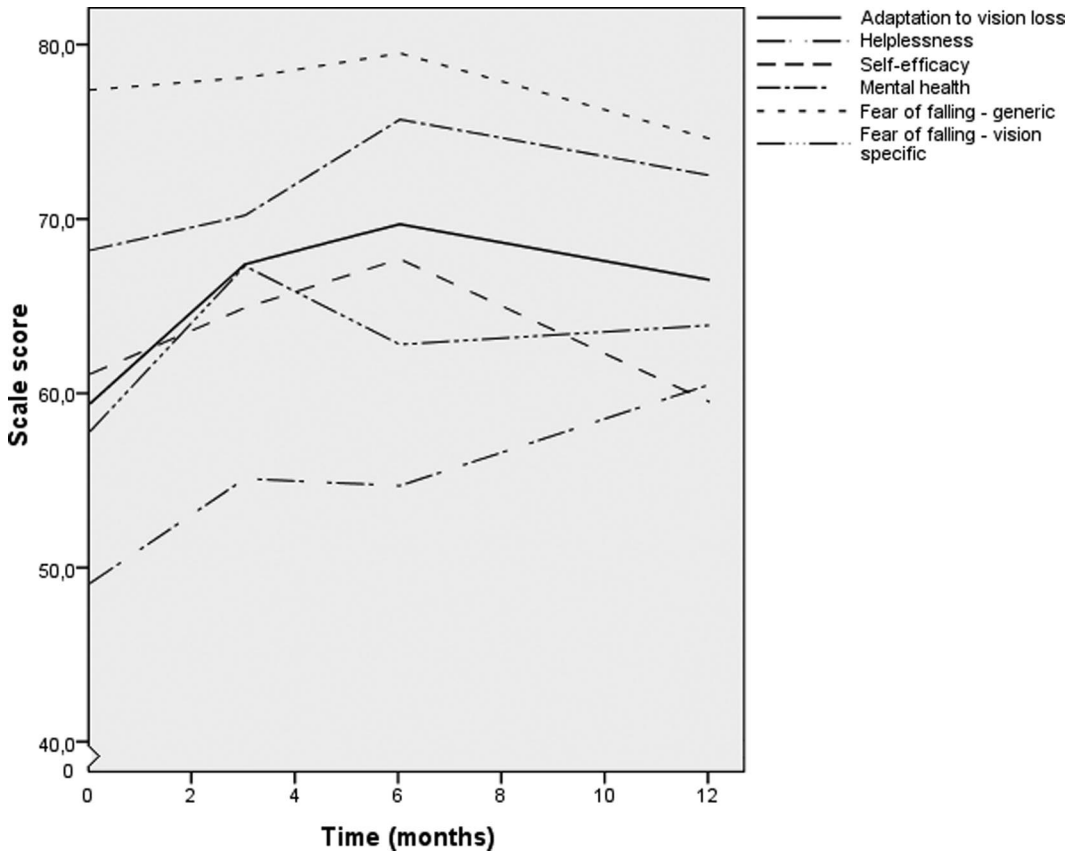


Figure 1. Changes in the outcome measures (standardized scores) throughout the intervention with higher scores indicating better psychosocial functioning. Higher scores indicate better adaptation, less helplessness, more self-efficacy, better mental health, and less fear of falling.

follow-up compared to the baseline ($r = 0.53$).

With respect to self-efficacy, the VIPP program initiated an increase in self-efficacy during the first part ($r = 0.30$), as well as during the second part, of the intervention ($r = 0.23$). This effect, however, was not maintained after the intervention was completed, as is shown by the decreased level in self-efficacy that was found at the long-term follow-up ($r = 0.58$). Self-efficacy at the long-term follow-up was lower than at the baseline ($r = 0.14$).

The effect sizes of mental health showed a pattern that was similar to that

found for self-efficacy. Mental health improved during the intervention ($r = 0.11$ and $r = 0.36$, respectively), but decreased once the intervention was completed ($r = 0.27$). A comparison between the baseline and the long-term follow-up, however, indicated an overall improvement in mental health ($r = 0.22$).

With respect to the fear of falling, we found a decrease in the generic fear of falling during the second part of the intervention ($r = 0.17$), but an increase after the completion of the intervention ($r = 0.35$). At the long-term follow-up, the generic fear of falling was higher than at the baseline ($r = 0.18$). Considering the

Table 3

Comparison of the mean scores of the psychosocial outcome measures at pretest (T0), halfway (T1), posttest (T2), and at six-months follow-up (T3).

Outcome measure	ANOVA		T0-T1		T1-T2		T2-T3		T0-T2		T0-T3	
	F ^a	η^2	F ^b	ES	F ^b	ES	F ^b	ES	F ^b	ES	F ^b	ES
Adaptation ^c	7.73***	0.24	15.33**	0.62	0.93	0.19	1.93	0.27	12.13**	0.57	10.41**	0.54
Helplessness	2.80*	0.10	1.60	0.25	0.01	0.02	2.96	0.33	1.80	0.26	9.68**	0.53
Self-efficacy	4.90**	0.16	2.41	0.30	1.36	0.23	12.68***	0.58	7.94***	0.50	0.51	0.14
Mental health	1.83	0.07	0.32	0.11	3.69	0.36	1.89	0.27	4.45*	0.39	1.22	0.22
Fear of falling												
Generic ^d	1.53	0.06	0.09	0.06	0.73	0.17	3.59	0.35	0.96	0.20	0.87	0.18
Vision-specific	1.95	0.07	8.27**	0.50	2.03	0.27	0.06	0.05	1.55	0.24	1.89	0.27

^a Degrees of freedom of the F-statistic were (3.75).

^b Degrees of freedom of the F-statistic were (1.25).

^c Sphericity was not assumed; F-statistic was the average of Greenhouse-Geisser adjusted F-statistic (2.309, 57.720) and Huynh-Feldt F-statistic (2.557, 63.933).

^d Sphericity was not assumed; F-statistic was the average of Greenhouse-Geisser adjusted F-statistic (2.316, 57.892) and Huynh-Feldt F-statistic (2.566, 64.149).

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

vision-specific fear of falling, the results showed a decrease during the first part of the intervention ($r = 0.50$) but an increase in the second half of the VIPP program ($r = 0.27$). A comparison between the baseline and the long-term follow-up, however, indicated a decrease in the vision-specific fear of falling ($r = 0.27$).

Discussion and conclusion

The aim of the pilot study was to investigate the impact of the VIPP program on the psychosocial functioning of elderly people with visual impairments. Directly after the intervention was completed, we found an increase in adaptation to vision loss and self-efficacy, as well as better mental health. In addition, helplessness and the generic and vision-specific fear of falling decreased. The six-month follow-up measure indicated improved adaptation to vision loss, lesser feelings of helplessness, better mental health, and a lower vision-specific fear of falling. In contrast, we found a decrease in self-efficacy and an increase in the generic

fear of falling at the long-term follow-up compared to the baseline.

Directly after the completion of the intervention, we found improved functioning for all outcome measures. Between the completion of the intervention and the six-month follow-up measure, only helplessness improved further, whereas the effect of the vision-specific fear of falling remained stable. The improvement in adaptation to vision loss and mental health during the intervention appeared to be a temporary effect and was followed by a decline after the intervention was completed. However, the six-month follow-up measure still indicated positive effects compared to the baseline. Unexpectedly, we found worse outcomes for self-efficacy and the generic fear of falling at the long-term follow-up, which may be explained by a possible seasonal effect, since the six-month follow-up measure took place during the winter, whereas T2 took place during the summer. Regular additional booster sessions may have been useful in preventing this decline in

psychosocial functioning after the intervention. Future studies need to investigate whether this decline continues after six months or is only temporary.

The psychological consequences of vision loss are increasingly recognized as an important component of the rehabilitation process and consequently have been investigated in previous studies. The results of our study are in line with the studies of Packer, Girdler, Boldy, Dhaliwal, and Crowley (2009) and Girdler, Boldy, Dhaliwal, Crowley, and Packer (2010), who reported positive effects of an 8-week vision self-management program on adaptation to vision loss and mental health immediately following the program and at the 12-week follow-up. A comprehensive in-patient rehabilitation training program for persons who are blind showed improved mental health immediately after rehabilitation and at the 6-month follow-up (Kuyk et al., 2008). As far as we know, no studies have assessed the effects of low vision rehabilitation on helplessness and the fear of falling.

With respect to self-efficacy, our findings are not consistent with those of other studies that found positive effects for general self-efficacy (Girdler et al., 2010) and disease-specific self-efficacy (Brody et al., 1999; Brody, Roch-Levecq, Thomas, Kaplan, & Brown, 2005; Girdler et al., 2010; Packer et al., 2009), whereas we found only a temporary effect during the intervention that had diminished at the 6-month follow-up. A potential explanation is that we measured self-efficacy as a general self-management ability, defined as the ability to gain and maintain a belief in personal competence (Steverink et al., 2005), whereas the other listed studies measured disease-specific self-efficacy, which

evaluates the degree of self-confidence in handling situations related to vision loss.

The VIPP program is, as far as we know, the first low vision intervention that combines a multidisciplinary group intervention with an individual goal-setting component and a home-based exercise program. Besides the added value of group learning, the individual goal setting enhances a person's motivation and assists persons who are visually impaired in their search for meaningful goals (Garnefski, Kraaij, De Graaf, & Karels, 2010). The multidisciplinary approach addresses the multidimensional learning process, since persons who are visually impaired have to acquire new skills and have to cope with the loss of normal vision, in addition to the emotional shift from being a typically sighted person to being a visually impaired person (McCabe, Nason, Demers-Turco, Friedman, & Seddon, 2000).

Despite the strengths of the VIPP program, some issues need to be considered when interpreting the findings of this small-scale pilot study. Although the small sample limited the statistical power, we found small to large effect sizes. The pretest–posttest design, however, provides only limited evidence. Because of the absence of a control group, it is difficult to draw conclusions on whether the effects were caused by the intervention or by other factors. Concerning the generalizability of our findings, it should be noted that the study included elderly persons with visual impairments who were referred to and registered at a low vision rehabilitation center. This recruitment procedure may have resulted in the selection of a subgroup of elderly people with visual impairments: those who were

motivated to seek rehabilitation. Last, the data on the outcome measures are self-report data that were derived from interviews that may have resulted in social desirability bias.

Vision loss causes major changes in lifestyle, life habits, and roles, which may result in problems with psychosocial adjustment (Williams et al., 1998). The association between the loss of activity and psychological well-being indicates that low-vision rehabilitation programs should focus not only on practical skills but on psychosocial aspects (Lindo & Nordholm, 1999). Therefore, the multidisciplinary group rehabilitation program described in this article included both. This pilot study is a first step toward documenting the effect of the VIPP program on psychosocial functioning. Although the findings are preliminary because of the small sample and the research design, the results are promising, as is shown by improved adaptation to vision loss, lower feelings of helplessness, better mental health, and a lesser vision-specific fear of falling at the six-month follow-up. Future studies with larger populations are needed to offer further evidence of the results of this pilot study. Furthermore, the costs of the VIPP program relative to the benefits of the program should be analyzed.

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